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INTERIM REPORT

# EVALUATION OF CONTROL METHODS FOR SCLERODERRIS CANKER IN PLANTATIONS AND NURSERIES 1967

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# EVALUATION OF CONTROL METHODS FOR SCLERODERRIS CANKER IN PLANTATIONS AND NURSERIES 1/ 1967

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## SUMMARY

Scleroderris canker, a tree disease caused by the fungus Scleroderris lagerbergii Gremmen, has caused serious losses in young red pine plantations in Upper Michigan and northern Wisconsin. Swedish investigators have suggested two approaches to the control of this disease, one involving a nursery fungicide spray program and the other a sanitary burn of previously infected plantations before replanting.

In 1966, three studies were begun to evaluate both of these control methods. Two of the studies will evaluate various nursery spray programs and the other will determine the effect of a sanitary burn.

Two field examinations of study plots have been completed, but no conclusive results have yet been obtained.

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1/ These studies are being conducted by Forest Pest Control, State and Private Forestry, in cooperation with the North Central States Forest Experiment Station and the National Forest Administration, Region 9.

## INTRODUCTION

Scleroderris canker, a tree disease caused by the fungus Scleroderris lagerbergii Gremmen, has caused serious losses in young red pine plantations in Upper Michigan and northern Wisconsin. The disease has a long history of injuries to young pine plantations and nurseries in Europe, and Kohh 2/ of Sweden suggested two approaches to its control. One approach involves a nursery spray program using the manganese fungicide maneb, and the other involves a sanitary burn, on sites where the disease has previously caused serious losses, before replanting.

Three studies were begun in 1966 to evaluate these control methods.3/ Study 1 will evaluate the effect of a maneb (Manzate, Registered by DuPont) spray applied to seedlings immediately prior to lifting from the nursery beds. Study 2 will evaluate summer nursery maneb sprays and summer sprays combined with prelift sprays applied 1 to 3 years previous to outplanting. Study 3 will evaluate the effect of a sanitary burn.

## OBJECTIVES

The general objectives of these evaluations are:

1. To determine if a fungicide spray program is necessary to prevent seedling infection by S. lagerbergii at the Forest Service nurseries.

2. To determine if the spray program proposed by Kohh of Sweden will give protection to Lake States nursery stock.

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2/ Kohh, Elmar, 1964. Om tallens gren- och granens topptorka och dess bekämpning. (Branch Dieback of Pine and Top Dieback of Spruce and its control.) Skogen 51: 200-203 (Translation in Field Office files.)

3/ The study plan for this evaluation, entitled, "Administrative Study Plan for Plantations and Nursery Control of Scleroderris Canker" (Line Project No. FS-NC-2301), was prepared by Darroll D. Skilling, Division of WM and Forest Protection Research, North Central Forest Experiment Station and Charles E. Cordell, Division of Forest Pest Control, formerly of the Northeastern Area, State and Private Forestry.

3. To determine if the rate of infection of red pine by S. lagerbergii can be reduced by a preplanting sanitary burn.

4. To measure the rate and pattern of Scleroderris infection in newly established plantations on burned and unburned sites.

## METHODS

### Spray evaluation (Study 1)

Study 1, initiated in the spring of 1966, is designed to answer two questions:

1. Will a maneb fungicide (Manzate), applied to nursery trees prior to lifting, give protection during the period immediately after planting?

2. Is there any difference in field infection rates using stock from different nurseries?

Red pine 3-0 stock from the Chittenden Nursery at Wellston, Michigan--where no Scleroderris infection has been found--was outplanted with 3-0 stock from the Toumey Nursery at Watersmeet, Michigan. Half of the Toumey stock was given a prelift spray. Therefore, three treatments were involved; Wellston "clean" stock, Toumey sprayed stock, and Toumey unsprayed stock.

Three replications (100 trees each) of each treatment were established at each of three locations in northern Wisconsin. The study locations are:

a. Lakewood Ranger District, Nicolet National Forest
b. Three Lakes Ranger District, Nicolet National Forest
c. Butternut Nursery (abandoned), Chequamegon National Forest

The outplantings are examined annually in the fall. At that time, tree survival is determined, and dead trees are removed for laboratory tests for the presence of S. lagerbergii.

### Spray evaluation (Study 2)

Study 2 is to be established over a 3-year period, with 3-0 Toumey nursery stock outplanted in spring 1967, 1968 and 1969. Its objective is to determine the value of summer

nursery sprays and summer sprays combined with prelift sprays applied for 1 to 3 years. Manzate summer sprays are applied when new needles are .5 cm. long and at 2-week intervals throughout the summer. Manzate prelift sprays are applied immediately prior to lifting. There will be nine treatments--three to be established in each of three years as follows:

1967 Treatments

1 year of summer spray
1 year of summer spray + prelift spray
Unsprayed

1968 Treatments

2 years of summer spray
2 years of summer spray + prelift spray
Unsprayed

1969 Treatments

3 years of summer spray
3 years of summer spray + prelift spray
Unsprayed

Number of replications, locations, and time and method of examinations are the same as for Study 1.

Preplanting burn (Study 3)

Two areas with a previous history of Scleroderris infection on the Washburn District of the Chequamegon National Forest were chosen for the preplanting burn evaluation. Each area was to have a burned and unburned ("check" or control) section. Burn Area 1 contains 10 acres, 4 of them burned. However, the unburned section of Burn Area 1 could not be sampled. Burn Area 2 contains a burned and an unburned section of approximately 20 acres each, with an isolation strip (unburned and unplanted) 5 chains wide between them.

Burning was done in the spring of 1966. The objective was a burn hot enough either to clear the area of all dead woody material or to surface sterilize this material.

After burning, the two study areas were planted with 3-0 red pine stock from a nursery in southern Wisconsin, where no Scleroderris infection has been found.

Permanent sample plots were then established in each area.

Burn Area 1 contains 3 plots, while Burn Area 2 contains 9 plots in each section. Each plot contains 30 trees. The plots are examined annually in the fall. At that time tree survival is determined, and dead trees are removed for laboratory tests for the presence of S. lagerbergii.

## RESULTS AND DISCUSSION

### Spray evaluation (Study 1)

The plots have been examined twice--in the fall 1966 and the fall of 1967. Scleroderris infection was found in only one tree--part of the Toumey prelift spray treatment of the Lakewood outplanting.

There is essentially no difference in survival among the three treatments. In fact, within each of the three locations, the differences in survival between replications are generally greater than the differences between treatments. Survival of the Lakewood outplantings in 1967 was very good (95%), the Three Lakes outplantings fair (78%), and the Butternut outplantings poor (45%). (See Table I.)

TABLE I. Tree Survival in the Study 1 Outplantings

| Location | Treatment (300 trees each) | Percent Survival (1967) |
|---|---|---|
| Lakewood | Wellston | 95.7 |
| | Toumey (sprayed) | 95.0 |
| | Toumey (unsprayed) | 95.0 |
| Three Lakes | Wellston | 77.6 |
| | Toumey (sprayed) | 76.7 |
| | Toumey (unsprayed) | 79.3 |
| Butternut | Wellston | 41.7 |
| | Toumey (sprayed) | 50.7 |
| | Toumey (unsprayed) | 41.3 |

The poor survival of the Butternut outplantings probably resulted from inadequate soil moisture in that locality in 1966.

In any case, it is reasonably certain that S. lagerbergii was not responsible for the losses.

Nursery and early field infection was apparently so rare that the results cannot be evaluated to determine the effectiveness of the treatments. Another examination is scheduled in 1968.

Spray evaluation (Study 2)

Only the 1967 treatments (one year of summer spray, one year of summer spray and a prelift spray, and unsprayed) have been outplanted. The first field examination will be made in 1968.

Preplanting burn (Study 3)

The preplanting burn study plots were examined in the fall of 1966 and the fall of 1967. No Scleroderris infection was found on any of the plots--burned or unburned. For some reason survival was better on the unburned area than either of the burned areas (Table II).

TABLE II. Tree Survival in the Burn Study plots

| Burn Area | Percent Survival (1967) | |
|---|---|---|
| | Burned | Unburned |
| 1 | 72 | -- |
| 2 | 66 | 81 |

Some difficulties were experienced in the establishment of the preplanting burn study. Administrative problems forced a last-minute change in plans with the following results:

1. No control (unburned) plots exist for Burn Area 1 because plots could not be placed in the unburned section.

2. In Burn Area 2 recognizable infection was sparce throughout the old plantation (though mortality from some cause was extensive enough to result in plantation failure), thus little innoculum may be present.

3. The burns possibly were not hot enough to destroy the potential disease innoculum, primarily due to the absence of suitable fuel in the old planting furrows.

It is not known how seriously these problems have compromised the value of the study.

## RECOMMENDATIONS

No recommendations based on this evaluation can be offered at this time.

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